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EXAMINER	
NGUYEN, TRAM HOANG	
ART UNIT	PAPER NUMBER
2818	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/711,640	JAGANNATHAN ET AL.	
	Examiner	Art Unit	
	TRAM H. NGUYEN	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14-20 and 31-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14-20,31-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 14-17, 32 and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Ma et al. (US 7,049,669; hereinafter Ma).

Regarding **claim 14**, Fig. 3 of Ma discloses a semiconductor device, comprising:

a substrate (1);

a source (34) and a drain (8) arranged within the substrate (1); a gate (4) formed on the substrate (1) between the source (34) and drain (8); and

a substrate contact (36) formed within the substrate (1) in electrical contact with the source (34), the substrate contact (20) being arranged adjacent to a side of the source without an intervening shallow trench isolation structure.

In reference to the claim language referring to the function of the semiconductor device, intended use and other types of functional language must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In re Casey,152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458,459 (CCPA 1963). In reference to the claim

language pertaining to the "wherein little or no current flows through the substrate contact", the claiming of a new use, new function, or unknown property which is inherently present in the prior art does not necessarily make the claim patentable. (In re Best, 195 USPQ 430,433 (CCPA 1977) and In re Swinehart, 439 F. 2d 210, 169 USPQ 226 (CCPA 1971); please see MPEP § 2112). Since Ma shows all the features of the claimed invention, the "wherein little or no current flows through the substrate contact" is an inherent property of the Ma invention.

Regarding **claim 15**, Ma discloses all the limitations of the claimed invention for the same reasons as set-forth above.

In reference to the claim language referring to the function of the substrate contact, intended use and other types of functional language must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In re Casey,152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458,459 (CCPA 1963). In reference to the claim language pertaining to the "substrate contact being configured to shield the semiconductor device from electrical noise", the claiming of a new use, new function, or unknown property which is inherently present in the prior art does not necessarily make the claim patentable. (In re Best, 195 USPQ 430,433 (CCPA 1977) and In re Swinehart, 439 F. 2d 210, 169 USPQ 226 (CCPA 1971); please see MPEP § 2112). Since Ma shows all the features of the claimed invention, the "substrate contact being configured

to shield the semiconductor device from electrical noise" is an inherent property of the Ma invention.

Regarding **claim 16**, Ma discloses all the limitations of the claimed invention for the same reasons as set-forth above. Besides, fig. 3 of Ma shows the substrate contact (36) being in direct physical contact with the source (34) of the semiconductor device.

Regarding **claim 17**, Ma discloses all the limitations of the claimed invention for the same reasons as set-forth above. Besides, Ma teaches the substrate contact (36) comprises a p+ region (see col. 4,line 39).

Regarding **claim 32**, Ma discloses all the limitations of the claimed invention for the same reasons as set-forth above. Besides, fig. 2 of Ma shows the semiconductor device comprises an FET prime cell.

Regarding **claim 45**, Ma discloses all the limitations of the claimed invention for the same reasons as set-forth above. Besides, fig. 3 of Ma shows the substrate contact (36) abuts the side of the source (34).

Claims 33-36, 40-44 are rejected under 35 U.S.C. 102(b) as being anticipated by Ma et al. (US 7,049,669; hereinafter Ma).

Regarding **claim 33**, Figs. 2-3 of Chang disclose a semiconductor device, comprising:

a substrate (22);

a source (24) and a drain (22) arranged within the substrate (22);

a gate (26) formed on the substrate (22) between the source (24) and the drain (22); and

a ring substrate contact (28) formed within the substrate (22) in electrical contact with the source (24),

wherein one of the ring substrate contact (sinker 28 has a ring shape as illustrated in fig. 3) abuts a side of the source and is arranged adjacent to the side of the source without an intervening shallow trench isolation structure (see fig. 2 of Chang).

Regarding **claim 34**, Chang discloses all the limitations of the claimed invention for the same reasons as set-forth above.

In reference to the claim language referring to the function of the ring substrate contact, intended use and other types of functional language must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In re Casey,152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458,459 (CCPA 1963). In reference to the claim language pertaining to “the ring substrate contact is configured to shield the semiconductor device from electrical noise”, the claiming of a new use, new function, or unknown property which is inherently present in the prior art does not necessarily make the claim patentable. (In re Best, 195 USPQ 430,433 (CCPA 1977) and In re Swinehart, 439 F. 2d 210, 169 USPQ 226 (CCPA 1971); please see MPEP § 2112). Since Ma

shows all the features of the claimed invention, “the ring substrate contact is configured to shield the semiconductor device from electrical noise” is an inherent property of the Ma invention.

Regarding **claim 35**, Chang discloses all the limitations of the claimed invention for the same reasons as set-forth above. Fig. 2 of Chang shows the ring substrate contact (28) is in direct physical contact with the source of the semiconductor device.

Regarding **claim 36**, Chang discloses all the limitations of the claimed invention for the same reasons as set-forth above except for the ring substrate contact comprises a p+ region.

Fig. 2 of Ma shows a similar semiconductor device having the substrate contact (36) comprises a p+ region.

Thereof, it would have been obvious to one having ordinary skills in the art at the time the invention was made to modify the ring substrate contact of Chang to have a p+ region as taught by Ma because the highly p-type regions provide a relatively low resistance path for the photo-generated carriers to follow.

Regarding **claim 40**, Chang discloses all the limitations of the claimed invention for the same reasons as set-forth above. Besides, fig. 3 of Chang shows the semiconductor device comprises an FET prime cell.

Regarding **claim 41**, Chang discloses all the limitations of the claimed invention for the same reasons as set-forth above. Besides, Fig. 3 of Chang shows the ring

substrate contact (refer to the guard ring 28) at least one of completely encircles an active region; almost completely encircles an active region; encircles three-quarters of an active region; and encircles half of an active region (see fig. 3).

Regarding **claim 43**, Figs. 2-3 of Chang disclose a semiconductor device, comprising:

a substrate (22);

a source (24) and a drain (22) arranged within the substrate (22);

a gate (26) formed on the substrate (22) between the source (24) and the drain (22); and

a substrate contact (28) formed within the substrate (22) in electrical contact with the source (24), the ring substrate contact (refer to the guard ring 28) at least one of completely encircles an active region; almost completely encircles an active region; encircles three-quarters of an active region; and encircles half of an active region (see fig. 3).

In reference to the claim language referring to the function of the semiconductor device, intended use and other types of functional language must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In re Casey,152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458,459 (CCPA 1963). In reference to the claim

language pertaining to the "wherein little or no current flows through the substrate contact", the claiming of a new use, new function, or unknown property which is inherently present in the prior art does not necessarily make the claim patentable. (In re Best, 195 USPQ 430,433 (CCPA 1977) and In re Swinehart, 439 F. 2d 210, 169 USPQ 226 (CCPA 1971); please see MPEP § 2112). Since Ma shows all the features of the claimed invention, the "wherein little or no current flows through the substrate contact" is an inherent property of the Ma invention.

Regarding **claim 44**, Chang discloses all the limitations of the claimed invention for the same reasons as set-forth above. Besides, fig. 3 of Chang shows the semiconductor device comprises an FET prime cell.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma as applied to claim 14 above, and further in view of Rice (US 4,738,936).

Regarding **claim 18**, Ma discloses all the limitations of the claimed invention for the same reasons as set-forth above except for the source comprises a source finger and the substrate contact abuts substantially all of one side of the source finger.

Fig. 1H of Rice has a similar structure (see col. 4, lines 36-38) having the source comprises a source finger (60) and the substrate contact (20) abuts all one side of the source finger (60) (col. 4, line 19).

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have the source comprises a source finger and the substrate contact abuts substantially all of one side of the source finger as taught by Rice in the device of Ma in order to reduce expensive packaging techniques, further reduce output capacitance, and to reduce or eliminate junction capacitance (see Rice: co1.1, lines 56-59).

Regarding **claim 19**, Ma discloses all the limitations of the claimed invention for the same reasons as set-forth above except for two source fingers arranged within substrate, wherein the substrate contact abuts two of the two source fingers.

Fig. 1H of Rice has a similar structure (see col. 4, lines 36-38) having two source fingers (refer to the upper portion and lower portion of left 60) arranged within substrate (10), wherein the substrate contact (20) abuts two of the two source fingers (60).

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have the source comprises a source finger and the substrate contact abuts substantially all of one side of the source finger as taught by Rice in the device of Ma in order to reduce expensive packaging techniques, further reduce output capacitance, and to reduce or eliminate junction capacitance (see Rice: co1.1, lines 56-59).

Claim 20 is rejected under 35 U.S.C.1 103(a) as being unpatentable over Ma as applied to claim 14 above, and further in view of Herzum et al. (US 2004/0238871; hereinafter Herzum)

Regarding **claim 20**, Ma discloses all the limitations of the claimed invention for the same reasons as set-forth above except for the substrate contact comprises a p-type doped silicon tab contacting source and silicide layer on a top of the substrate contact.

Herzum has a similar structure wherein fig. 3 shows the substrate contact (reference numeral 12) comprises a p-type doped silicon tab contacting source (reference numeral 14) and a silicide layer (reference numeral 52) on a top of the substrate contact (reference numeral 12). Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to include the

substrate contact comprises a p-type doped silicon tab contacting source and silicide layer on a top of the substrate contact as taught by Herzum in device of Ma so that it reduces the resistance.

Claim 31 is rejected under 35 U.S.C.1 103(a) as being unpatentable over Ma as applied to claim 14 above, and further in view of Chang et al. (US 6,624,030; hereinafter Chang)

Regarding **claim 31**, Ma discloses all the limitations of the claimed invention for the same reasons as set-forth above except for the substrate contact at least one of completely encircles an active region; almost completely encircles an active region; encircles three-quarters of an active region; and encircles half of an active region.

Fig. 3 of Chang shows a similar semiconductor device having the substrate contact (refer to the guard ring 28) at least one of completely encircles an active region; almost completely encircles an active region; encircles three-quarters of an active region; and encircles half of an active region (see fig. 3).

Thereof, it would have been obvious to one having ordinary skills in the art at the time the invention was made to have the substrate contact at least one of completely encircles an active region; almost completely encircles an active region; encircles three-quarters of an active region; and encircles half of an active region as taught by Chang in the device of Ma in order to increases current flow at a lower turn-on voltage (see col. 2, lines 30-33).

Claims 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma as applied to claim 14 above, and further in view of Rice (US 4,738,936).

Regarding **claim 37**, Chang discloses all the limitations of the claimed invention for the same reasons as set-forth above except for the source comprises a source finger and the ring substrate contact abuts substantially all of one side of the source finger.

Fig. 1H of Rice has a similar structure (see col. 4, lines 36-38) having the source comprises a source finger (60) and the substrate contact (20) abuts all one side of the source finger (60) (col. 4, line 19).

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Rice and Chang to include source comprises at least two source fingers arranged within the substrate, wherein the ring substrate contact abuts two of the at least two source fingers in order to reduce expensive packaging techniques, further reduce output capacitance, and to reduce or eliminate junction capacitance (see Rice: co1.1, lines 56-59).

Regarding **claim 38**, Chang discloses all the limitations of the claimed invention for the same reasons as set-forth above except for two source fingers arranged within substrate, wherein the ring substrate contact abuts two of the two source fingers

Fig. 1H of Rice teaches two source fingers (refer to the upper portion and lower portion of left 60) arranged within substrate (10), wherein the substrate (10) contact abuts two of the two source fingers (60).

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Rice and Chang to include two source fingers arranged within substrate, wherein the ring substrate contact abuts two of the two source fingers in order to reduce expensive packaging techniques, further reduce output capacitance, and to reduce or eliminate junction capacitance (see Rice: co1.1, lines 56-59).

Claim 39 is rejected under 35 U.S.C.1 103(a) as being unpatentable over Ma as applied to claim 14 above, and further in view of Herzum et al. (US 2004/0238871; hereinafter Herzum)

Regarding **claim 39**, Chang discloses all the limitations of the claimed invention for the same reasons as set-forth above except for the ring substrate contact comprises a p-type doped silicon tab contacting the source and further comprising a silicide layer arranged on top of the ring substrate contact.

Herzum has a similar structure wherein fig. 3 shows the substrate contact (reference numeral 12) comprises a p-type doped silicon tab contacting source (reference numeral 14) and a silicide layer (reference numeral 52) on a top of the substrate contact (reference numeral 12).

Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to combine Herzum and Chang to have the ring substrate contact comprises a p-type doped silicon tab contacting the source and

further comprising a silicide layer arranged on top of the ring substrate contact because of reducing the resistance.

Conclusion

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tram Hoang Nguyen whose telephone number is (571)272-5526. The examiner can normally be reached on Monday-Friday, 8:30 AM – 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke can be reached on (571)272-1657. The fax numbers for all communication(s) is (703)872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571)272-1625.

/Tram H Nguyen/
Examiner, Art Unit 2818

/Dao H Nguyen/
Primary Examiner, Art Unit 2818